University of California
Lawrence Livermore National Laboratory

Nonproliferation, Arms Control, and International Security Directorate

March 1997

UCRL-MI-121428-NAI-9

Our Counterproliferation Analysis and Planning System is an extremely valuable tool for evaluating options for denying or reversing proliferation

Reversing Proliferation

If activities indicative of weapons development or production are detected, the next step is to evaluate options for reversing proliferation. Computational simulation, combined with Livermore's extensive experience in nuclear weapons development, nuclear testing, and chemical and biological science, is central to this effort.

The CAPS Modeling System

We have developed a versatile and powerful modeling system for analyzing proliferation activities of foreign countries. With the Counterproliferation Analysis and Planning System (CAPS), we can model the various processes (chemical, biological, metallurgical, etc.) that others use to build weapons of mass destruction and their delivery systems. We can also use CAPS to evaluate the consequences of possible interdiction options, including environmental and socio-economic effects.

Drawing upon information from many sources (e.g., the U.S. intelligence community, international commercial databanks, private industry), we can generate models of a specific country's proliferation activities. We can identify the function and location of suspected production sites. In some cases, we can even model the layout of individual facilities. By modeling proliferation activities at this level of detail, we can analyze the country's specific approach to weapons production. We can then identify critical processing steps or production facilities which, if denied, would prevent that country from acquiring weapons of mass destruction.

CAPS Features

- Models chemical, biological, and metallurgical processes that can be used to build weapons of mass destruction (missiles and nuclear, chemical, and biological warheads).
- Integrates information from diverse sources to create country-specific models of proliferation, identifying the specific function and location of major production sites and creating details of the layout of each site.
- Performs nodal analyses on each country-specific model to identify critical nodes in the country's proliferation production facilities.
- Provides completed analyses in a logical and easy-to use-format, utilizing the latest advances in commercial computer software development.

Upgrades in Progress

We are in the process of augmenting CAPS with demographic data and atmospheric plume models developed for Livermore's National Atmospheric Release Advisory Center. This upgrade will allow us to analyze collateral damage resulting from possible interdiction actions, including such socio-economic and environmental consequences as civilian injuries, crop loss, and damage to water aquifers. We are also building a suite of chemical databases that will allow us to evaluate the effects of industrial chemicals that could be released into the environment as the result of interdiction actions against proliferant sites.

Benefits to the Nation

Analyses with CAPS provide valuable and credible technical input to the decision-making agencies and individuals who must determine the U.S. response to proliferation activities. For example, these counterproliferation analyses are an important contribution to the U.S. Strategic Command in its role as a support command in the nation's counterproliferation effort. CAPS analyses are also supporting counterproliferation exercises and planning conducted by the U.S. Special Operations Command, the Air Force, the Department of State, the Defense Intelligence Agency, and the Central Intelligence Agency.

Contact

Tom Ramos, Project Leader, Counterproliferation Analysis and Planning (Nonproliferation, Arms Control, and International Security Directorate); Phone: (510) 423-2515; Fax: (510) 422-3821; E-mail: ramos7@llnl.gov

Work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.